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**Billman**

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(54) **SYSTEMS AND METHODS FOR DEVICE EMULATION ON MOBILE CHANNEL**

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(51) **Int. Cl.**

| | |
|---|---|
| ***H04W 4/14*** | (2009.01) |
| ***H04L 29/08*** | (2006.01) |
| ***H04W 4/16*** | (2009.01) |
| ***H04M 1/725*** | (2006.01) |

(52) **U.S. Cl.**
CPC ..... ***H04L 67/08*** (2013.01); ***H04M 1/72561*** (2013.01); ***H04W 4/16*** (2013.01)

(58) **Field of Classification Search**
CPC ... H04L 67/1095; H04L 65/60; H04L 43/16; G06F 3/0484; G06F 17/30684; G06F 17/3053; H04W 4/025; H04W 8/18; G01L 17/22
USPC ..... 455/426.1, 414.1, 418; 370/328; 345/581, 600; 707/1.1
See application file for complete search history.

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|---|---|---|---|---|
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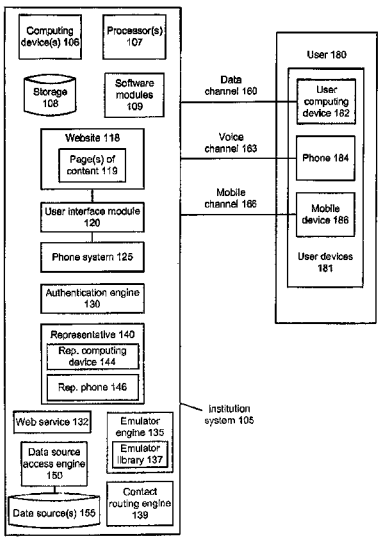
(57) **ABSTRACT**

A user may access a website via a mobile channel using a mobile device. As the user is logged into the website, the user may call or otherwise contact a representative via another communications channel with the mobile device or another user device, such as a phone or a user computing device or another mobile device. An emulator engine may determine the type of mobile device that the user is using to access the website via the mobile channel. An emulator for the mobile device that has been determined may be retrieved from an emulator library and provided to the representative computing device. The representative may view the same user interface on the representative computing device that the user sees on the mobile device.

**12 Claims, 6 Drawing Sheets**



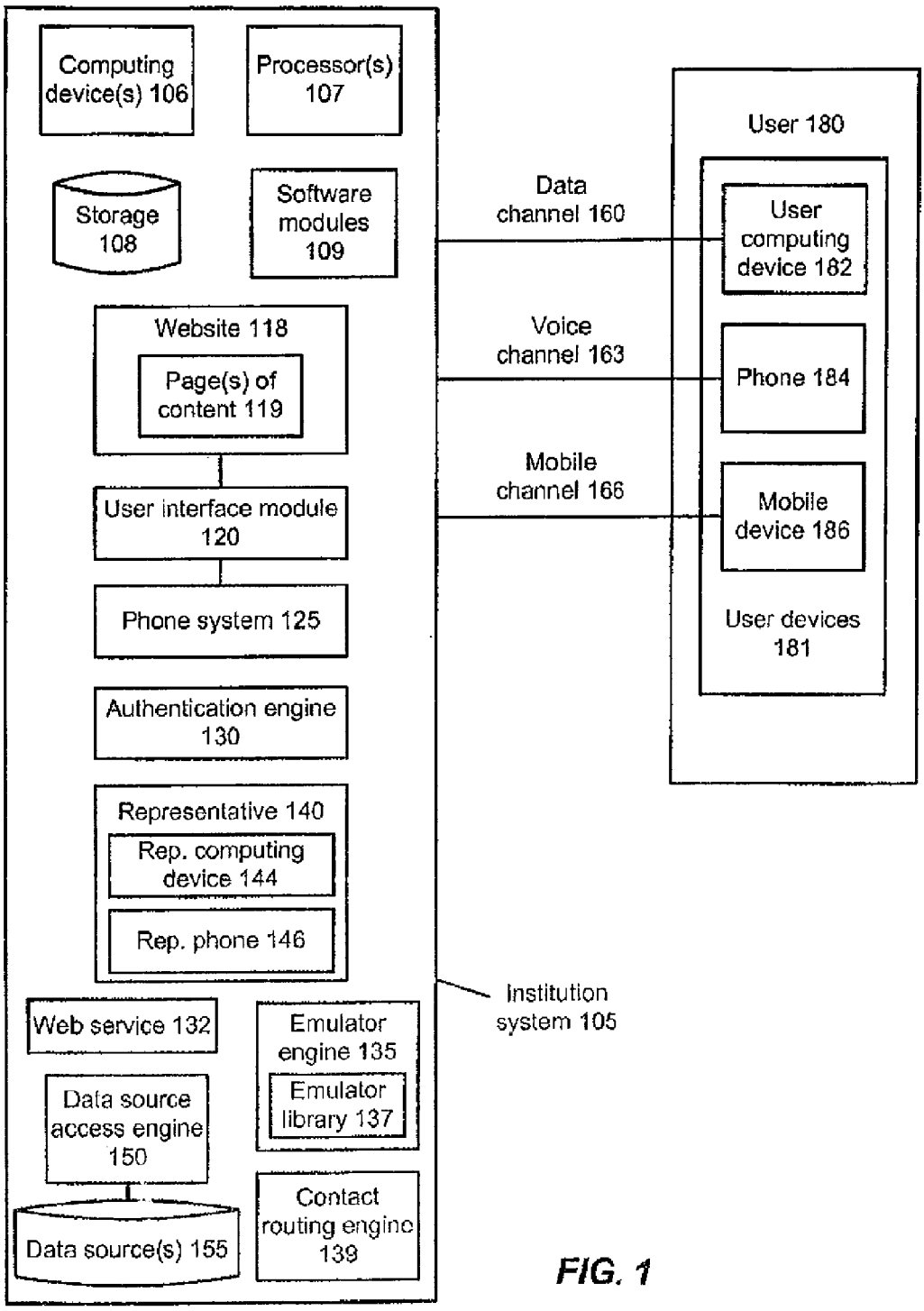

Computing device(s) 106
Processor(s) 107
Storage 108
Software modules 109
Website 118
Page(s) of content 119
User interface module 120
Phone system 125
Authentication engine 130
Representative 140
Rep. computing device 144
Rep. phone 146
Web service 132
Data source access engine 150
Data source(s) 155
Emulator engine 135
Emulator library 137
Contact routing engine 139
Institution system 105
Data channel 160
Voice channel 163
Mobile channel 166
User 180
User computing device 182
Phone 184
Mobile device 186
User devices 181

FIG. 1

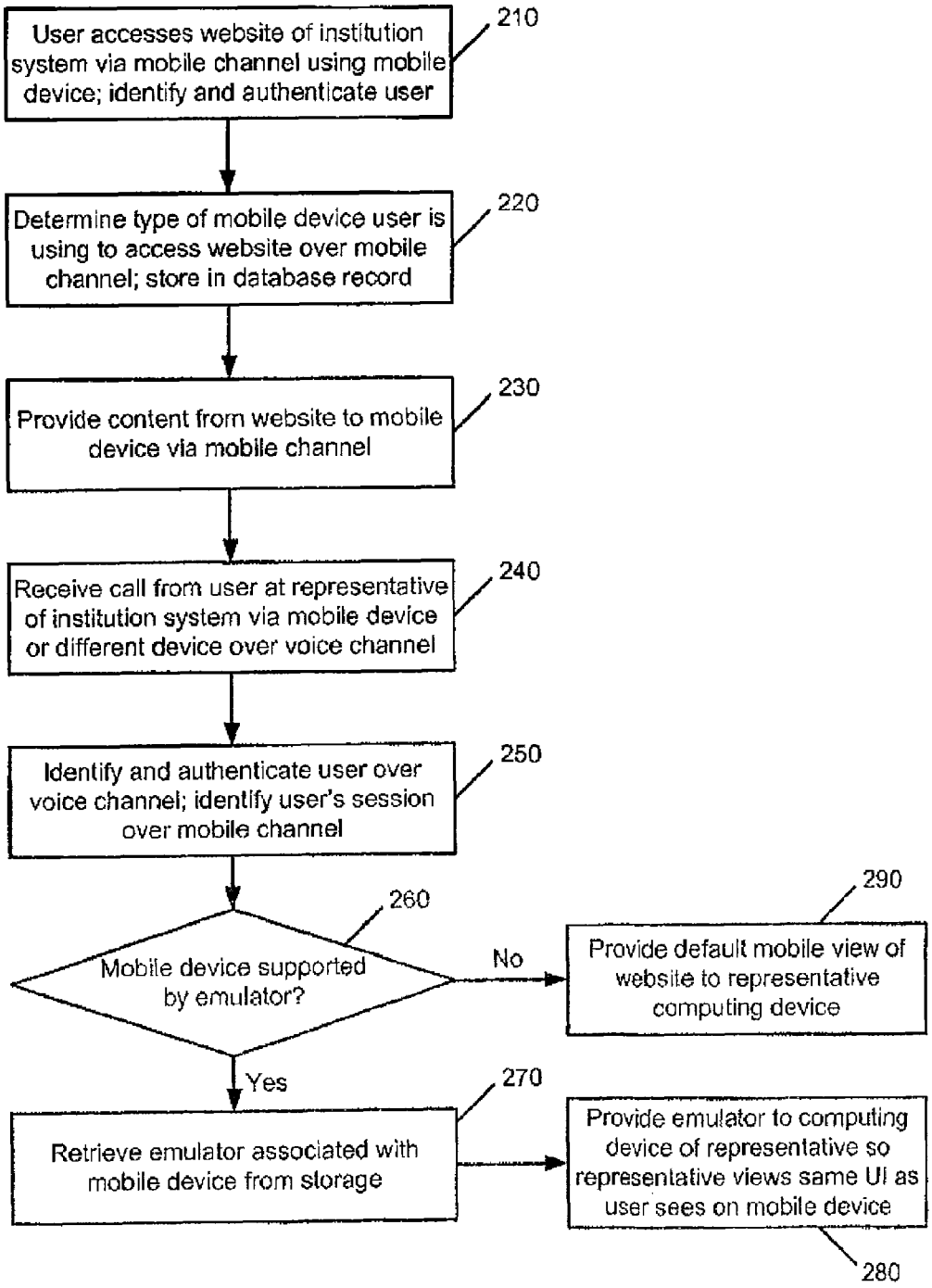
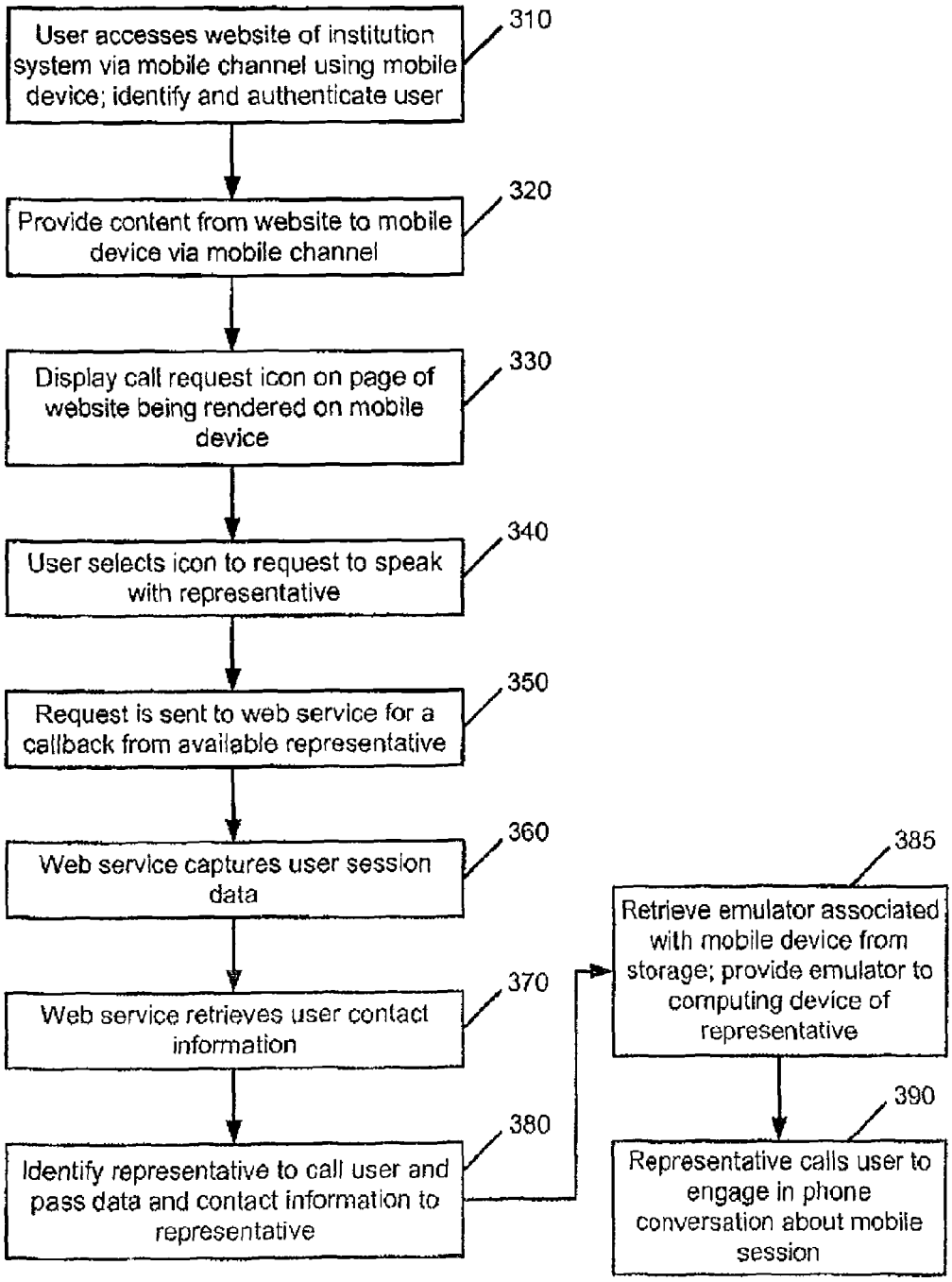

User accesses website of institution system via mobile channel using mobile device; identify and authenticate user
210
Determine type of mobile device user is using to access website over mobile channel; store in database record
220
Provide content from website to mobile device via mobile channel
230
Receive call from user at representative of institution system via mobile device or different device over voice channel
240
Identify and authenticate user over voice channel; identify user's session over mobile channel
250
Mobile device supported by emulator?
260
No
Provide default mobile view of website to representative computing device
290
Yes
Retrieve emulator associated with mobile device from storage
270
Provide emulator to computing device of representative so representative views same UI as user sees on mobile device
280
200

FIG. 2


User accesses website of institution system via mobile channel using mobile device; identify and authenticate user
310
Provide content from website to mobile device via mobile channel
320
Display call request icon on page of website being rendered on mobile device
330
User selects icon to request to speak with representative
340
Request is sent to web service for a callback from available representative
350
Web service captures user session data
360
Web service retrieves user contact information
370
Identify representative to call user and pass data and contact information to representative
380
Retrieve emulator associated with mobile device from storage; provide emulator to computing device of representative
385
Representative calls user to engage in phone conversation about mobile session
390

300

FIG. 3

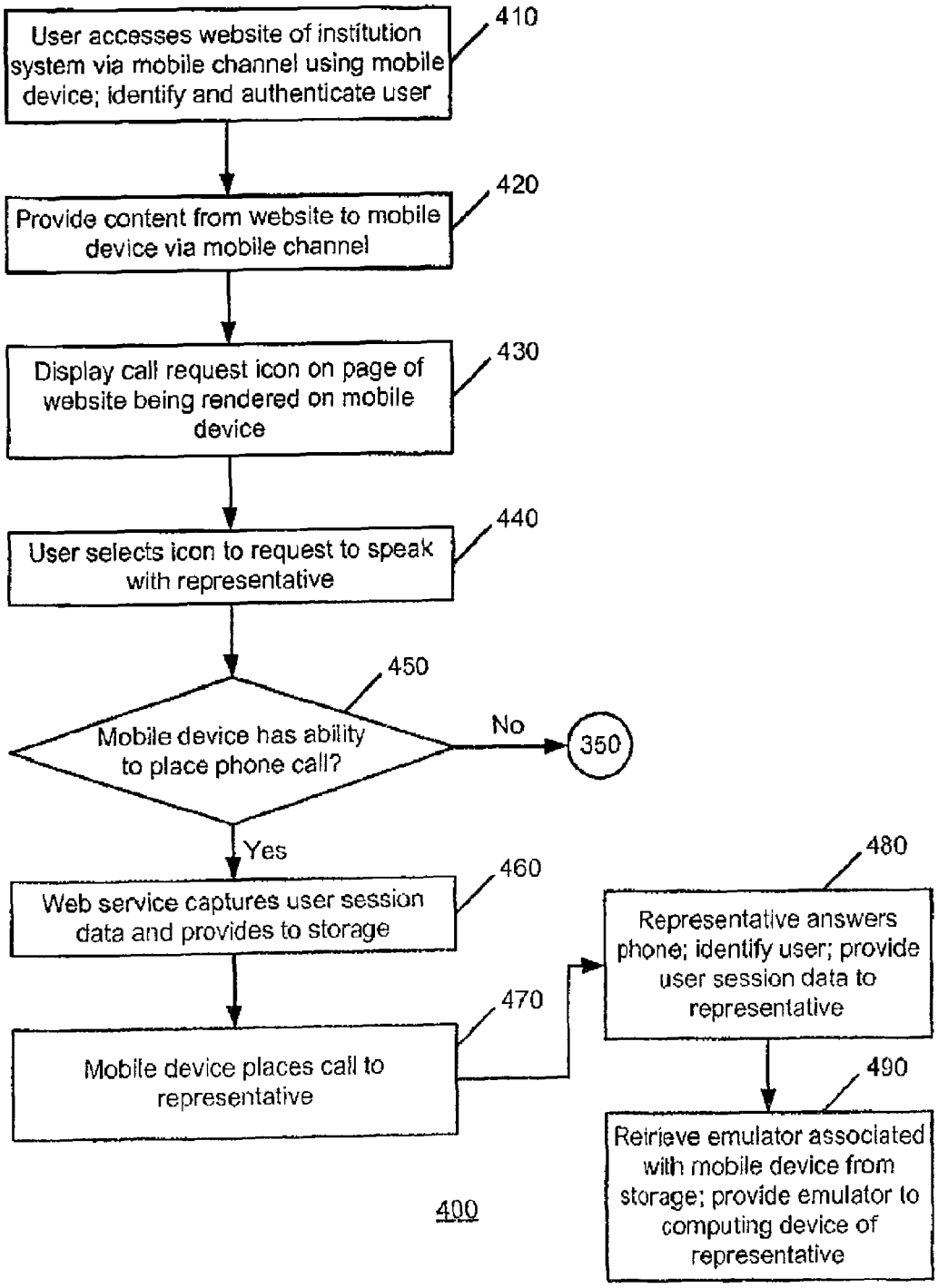
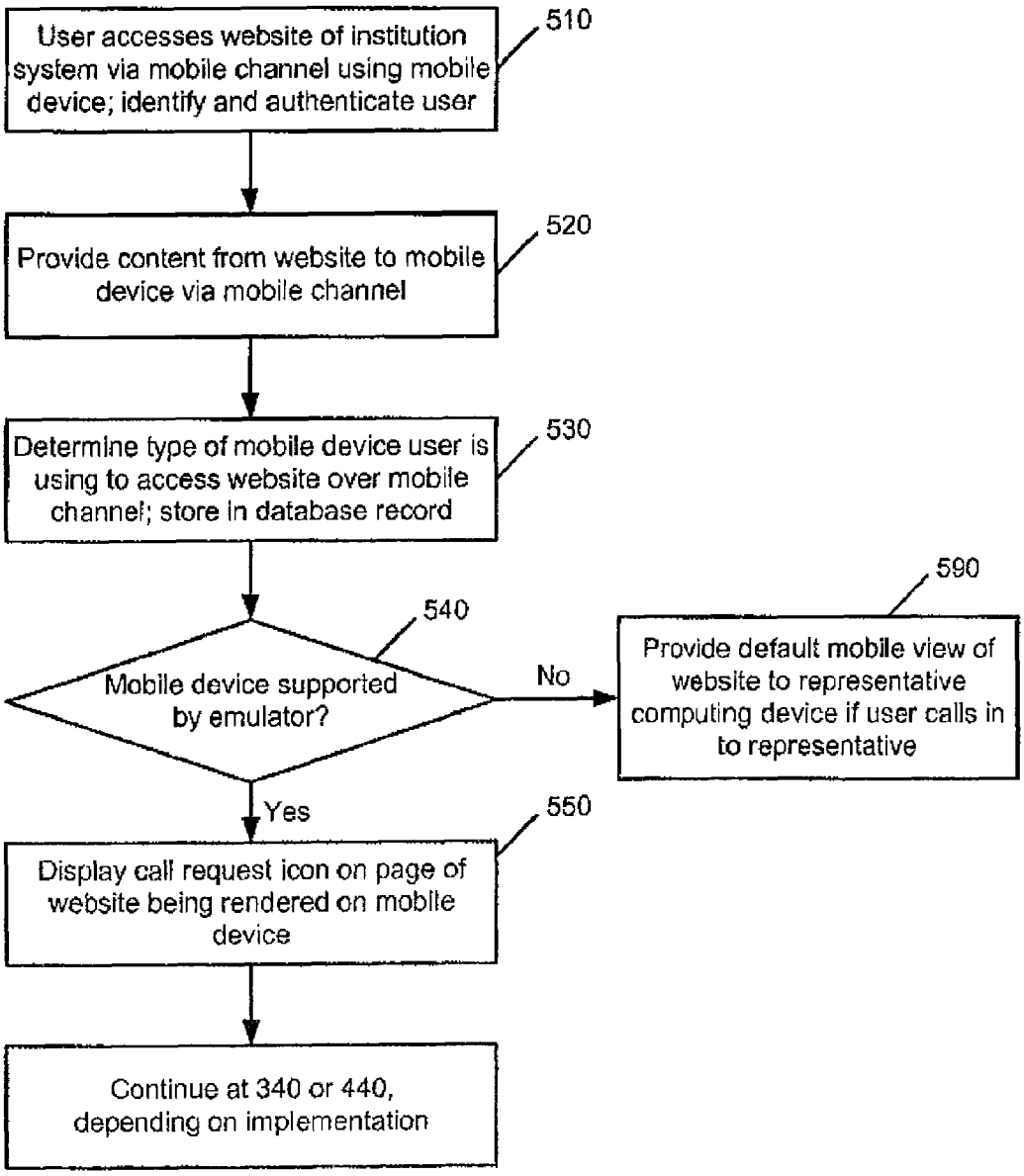

User accesses website of institution system via mobile channel using mobile device; identify and authenticate user
410
Provide content from website to mobile device via mobile channel
420
Display call request icon on page of website being rendered on mobile device
430
User selects icon to request to speak with representative
440
Mobile device has ability to place phone call?
450
No
350
Yes
Web service captures user session data and provides to storage
460
Mobile device places call to representative
470
Representative answers phone; identify user; provide user session data to representative
480
Retrieve emulator associated with mobile device from storage; provide emulator to computing device of representative
490
400

FIG. 4


User accesses website of institution system via mobile channel using mobile device; identify and authenticate user
510
Provide content from website to mobile device via mobile channel
520
Determine type of mobile device user is using to access website over mobile channel; store in database record
530
Mobile device supported by emulator?
540
No
Provide default mobile view of website to representative computing device if user calls in to representative
590
Yes
Display call request icon on page of website being rendered on mobile device
550
Continue at 340 or 440, depending on implementation

500

*FIG. 5*

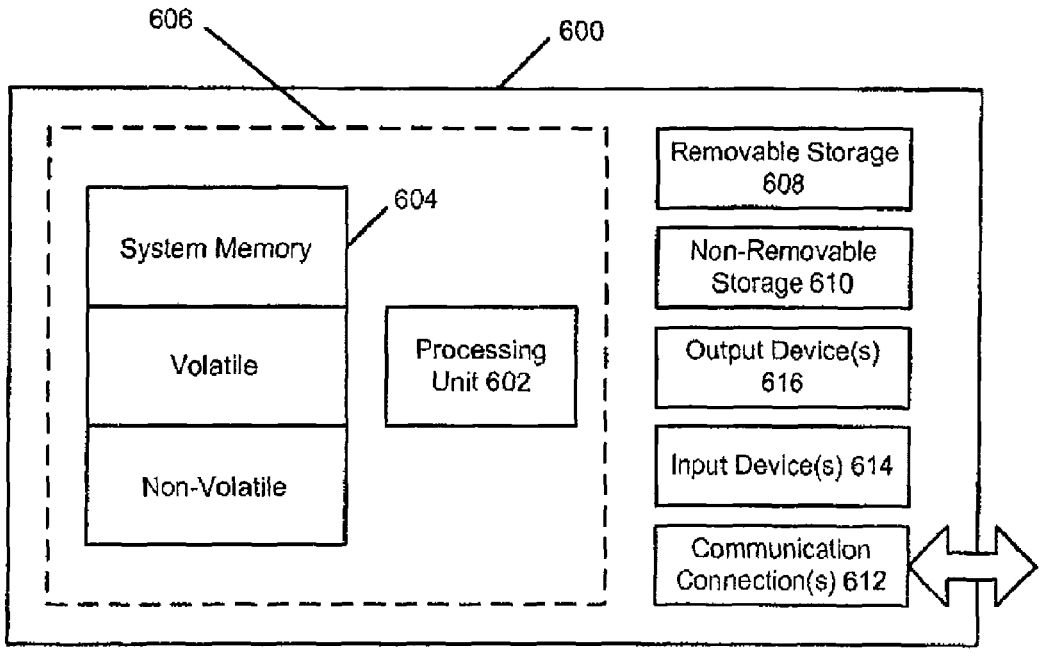

606
600
604
System Memory
Volatile
Non-Volatile
Processing Unit 602
Removable Storage 608
Non-Removable Storage 610
Output Device(s) 616
Input Device(s) 614
Communication Connection(s) 612

*FIG. 6*

# SYSTEMS AND METHODS FOR DEVICE EMULATION ON MOBILE CHANNEL

This application is a Continuation of U.S. patent application Ser. No. 13/311,756, filed Dec. 6, 2011, now U.S. Pat. No. 8,412,165, which is a Continuation of U.S. patent application Ser. No. 12/487,908 filed on Jun. 19, 2009, now U.S. Pat. No. 8,072,926, which is herein incorporated by reference.

## BACKGROUND

A communications channel refers to the medium used to convey information from a sender to a receiver. Mobile communications channels (referred to herein as a "mobile channels") are well known and may be used by mobile devices. Mobile devices include cellular phone devices, mobile phones, smartphones, handheld computing devices, personal digital assistants, and the like.

Mobile devices may be used by users to access content on a website of a business entity via a mobile channel. Different mobile devices, e.g., depending on the mobile device type and/or manufacturer, have different user interfaces. Thus, the user is presented with a particular arrangement of content from the website, options, menus, selections, etc., depending on the mobile device they are using. The arrangements of content, options, menus, selections, etc. that are presented to the user may vary among the different mobile devices.

Because the user interfaces of the mobile devices differ, it is difficult for a representative of the business entity to assist (e.g., remotely, via phone, etc.) a user who is accessing content on the website on the mobile channel. The representative is not able to specifically see what the user is seeing at the mobile device level for the particular mobile device of the user.

## SUMMARY

A user may access a website via a mobile channel using a mobile device. As the user is logged into the website, the user may call or otherwise contact a representative via another communications channel. An emulator engine may determine the type of mobile device that the user is using to access the website via the mobile channel. An emulator for the mobile device that has been determined may be retrieved from an emulator library and provided to the representative computing device. The representative may view the same user interface on the representative computing device that the user sees on the mobile device.

In an implementation, the user may call or otherwise contact a representative with the mobile device that is being used to access the website. In an implementation, the user may call or otherwise contact a representative with another user device besides the mobile device that is being used to access the website, such as a phone or a user computing device or another mobile device.

In an implementation, the user may request a callback from the representative via the website, and the representative may call the user back on the mobile device or another user device.

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.



## BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of illustrative embodiments, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the embodiments, there are shown in the drawings example constructions of the embodiments; however, the embodiments are not limited to the specific methods and instrumentalities disclosed. In the drawings:

FIG. **1** is a block diagram of an implementation of a system that may be used to provide device emulation on a mobile channel;

FIG. **2** is an operational flow of an implementation of a method that may be used to provide device emulation on a mobile channel;

FIG. **3** is an operational flow of another implementation of a method that may be used to provide device emulation on a mobile channel;

FIG. **4** is an operational flow of another implementation of a method that may be used to provide device emulation on a mobile channel;

FIG. **5** is an operational flow of another implementation of a method that may be used to provide device emulation on a mobile channel; and

FIG. **6** is a block diagram of an example computing environment in which example embodiments and aspects may be implemented.

## DETAILED DESCRIPTION

FIG. **1** is a block diagram of an implementation of a system that may be used to provide device emulation on a mobile channel. An institution system **105** may include an authentication engine **130**. The authentication engine **130** may authenticate a user **180** who is attempting to access the institution system with one or more user devices **181** by a communications channel, such as a data channel **160** associated with a user computing device **182**, a voice channel **163** associated with a phone **184**, or a mobile channel **166** associated with a mobile device **186**. It is contemplated that more than one of the communications channels may be used by a single user device, such as the user computing device **182**, the phone **184**, or the mobile device **186** to access the institution system **105**, as described further herein.

The user **180** may be seeking access to the institution system **105** to obtain information about an institution associated with the institution system **105**, an account of the user **180** maintained by the institution system, products or services, or to speak with a representative **140**, for example. The institution may be any type of entity or business. For example, the institution may be a financial services institution, a credit card association or member of a credit card association, a retail bank, an investment bank, an investment company, etc. The institution system **105** may include any combination of systems and subsystems such as electronic devices including, but not limited to, computers, servers, databases, or the like. The electronic devices may include any combination of hardware components such as processors, databases, storage drives, registers, cache, random access memory (RAM) chips, data buses, or the like and/or software components such as operating systems, database management applications, or the like.

The user devices **181** and communications channels described herein are examples only, and any number and any

types of user devices **181** and communications channels may be implemented. The phone **184** may be any type of telecommunications device used to transmit and receive sound, such as a corded telephone, a cordless phone, a mobile phone, etc. The mobile device **186** may be any type of mobile computing device, such as a mobile phone, a smartphone, a handheld computing device, or a personal digital assistant (PDA). An example user computing device **182** is described with respect to FIG. **6**. Additionally, any number of users with associated user devices may be in communication with the institution system **105**.

Each of the user computing device **182**, the phone **184**, and the mobile device **186** may be connected with the institution system **105** over one or more communications channels of an associated network. It is contemplated that each network may be any type of private or public communication network such as, for example, an intranet, Internet, local area network (LAN), wide area network (WAN), wireless fidelity (WiFi) network, cellular connection, plain old telephone service (POTS), a public switched telephone network (PSTN), a voice over Internet protocol (VoIP) network, and the like. The user computing device **182**, the phone **184**, and the mobile device **186** may be connected to the institution system **105** over the same network or different networks.

The institution system **105** may comprise a representative **140** who may have an associated representative computing device **144** and representative phone **146**. The representative **140** may communicate with the user **180** over a communications channel using the representative computing device **144** or the representative phone **146**. An example representative computing device **144** is described with respect to FIG. **6**, and the representative phone **146** may be any type of telecommunications device used to transmit and receive sound. Although only one representative is shown in FIG. **1**, it is contemplated that any number of representatives and associated representative computing devices and representative phones may be in communication with or otherwise associated with the institution system **105** and may be used for communication with the user **180**.

As described further herein, the user **180** may access a website **118** of the institution system **105** via the mobile channel **166** using the mobile device **186**. The website **118** provided via the mobile channel **166** may be different than the website provided via the data channel **160** to the user computing device **182**, for example, with respect to displays, content, and/or tools provided to the user **180**.

At some point, as the user **180** is logged into the website **118** via the mobile channel **166**, the user **180** may call or otherwise contact the representative **140** via another communications channel with the mobile device **186** or another of the user devices **181**, such as the phone **184** or the user computing device **182** or another mobile device. Thus, in an implementation, at some point, the user **180** may initiate another connection to the institution system **105** via a second communications channel with a second user device that is different than the mobile device **186** via the first communications channel (e.g., the mobile channel **166**). For example, the user **180** may wish to speak with the representative **140** of the institution system **105** about a user account, a product or service, etc. In an implementation, the user **180** may initiate this connection by calling the representative **140** or the institution system **105** or by requesting a call from the representative **140**, e.g., via a request made on the website **118**. In this case, the communications channel may be a voice channel such as the voice channel **163**.

An emulator engine **135** may determine the type of mobile device **186** (e.g., Apple iPhone, Research in Motion BlackBerry, Samsung, Nokia, etc.) that the user **180** is using to access the website **118** via the mobile channel **166**. Any known technique may be used to determine the type of mobile device **186** that is being used to access the website **118**.

An emulator library **137** comprises a plurality of emulators of various types of mobile devices. An emulator for the mobile device **186** that has been determined may be retrieved from the emulator library **137**, if such an emulator is available, and provided to the representative computing device **144**. In this manner, the representative **140**, when speaking or otherwise communicating with the user **180** (e.g., by the voice channel, by instant message, by text message, by web chat, using the representative phone **146**, etc.) about the website **118** as rendered on the mobile device **186** via the mobile channel **166**, may view the same user interface on the representative computing device **144** that the user **180** sees on the mobile device **186**. This allows for more accurate and detailed service from the representative **140** to the user **180** regarding the website **118** and information associated with, or provided by, the website **118**.

An emulator duplicates (i.e., provides an emulation of) the functions of one system using a different system, so that the second system behaves like and appears to be the first system. Emulation refers to the ability of a computer program or electronic device to imitate another program or device. Thus, emulation allows the representative computing device **144** to provide the representative **140** with the look, feel, and behavior of the mobile device **186** (e.g., the user interface of the mobile device **186**) that has been determined to be in use by the user **180**.

For example, if the mobile device **186** of the user **180** is determined to be an iPhone, an iPhone emulator may be provided to the representative computing device **144** that mimics the user interface of the website **118** provided to the mobile device **186**. The user **180** activity may be tracked by the institution system **105**, e.g., by the emulator engine **135**, and such activity may be provided to the representative **140** and/or the representative computing device **144** on displays that are the same as those being provided to the mobile device **186** so that the representative **140** can see the actions that the user **180** is taking. Although providing the emulator on the representative computing device **144** with data regarding the user **180** and their activity is not co-browsing, the representative **140** and the user **180** may have the same experience with respect to the website **118** as provided on the mobile device **186**, and allows the representative **140** to avoid "what are you seeing?" type questions to the user **140** during the communication (e.g., via voice, instant message, text message, web chat, etc.) between the representative **140** and the user **180**.

The authentication engine **130** and the emulator engine **135** may analyze, process, and store the data from the user **180** and the user devices **181** and the representative **140** in one or more data sources **155** via a data source access engine **150**. The data may also be stored in other storage, perhaps in storage associated with the institution system **105** such as storage **108**. The authentication engine **130** may use the data to authenticate the user **180** (e.g., via strong authentication, via weak authentication, etc.) to permit the user **180** access to content associated with the institution system **105** via a communications channel through which the user **180** is seeking access. Data that may be stored may include personal data about the user **180**, such as user names, pass-

words, pass phrases, personal identification numbers (PINS), and other data that may be used to identify and authenticate the user **180**.

The institution system **105** may include a user interface module **120**. The user interface module **120** may generate and format one or more pages of content **119** as a unified graphical presentation that may be provided to one or more of the user devices **181**, such as the mobile device **186**, as an output from the institution system **105**. The page(s) of content **119** may be provided to the mobile device **186** via the website **118** associated with the institution system **105**. The page(s) of content **119** may be provided to other user devices **181** of the user **180**, such as the phone **184** or the user computing device **182**, depending on the implementation.

In an implementation, instead of hosting the website **118**, the institution system **105** may comprise a conventional application server hosting a proprietary online service accessible only a private network. In any event, the institution system **105** may have appropriate security mechanisms in place to prevent unauthorized third parties from intercepting the user's information.

The institution system **105** may also comprise a web service **132**. The web service **132** may capture the user session data (e.g., contextual information, such as user identifier, webpage clicked from, additional session information, etc.). In an implementation, the web service **132** may make a call to storage, such as the data source(s) **155** or the storage **108** for a data lookup to retrieve the user's previously stored phone numbers or contact information (e.g., gathered from a user's earlier purchase, membership or registration information, or public sources such as online telephone listings or books).

The user interface module **120** may provide the user **180** with access to a phone system **125** of the institution system **105**. The phone system **125** may be any type of system that may provide information to a device of the user **180**, such as the phone **184** or the mobile device **186**. In an implementation, the phone system **125** may use any type of phone menu system and may use interactive voice response (IVR) which is a phone technology that allows a computer to detect voice and touch tones using a phone call. An IVR system can respond with prerecorded or dynamically generated audio to further direct users on how to proceed. IVR systems can be used to control almost any function where the interface can be broken down into a series of menu choices. For example, the user **180** may dial a phone number that is answered by an IVR system. The IVR system may execute an application which is tied to the number dialed. As part of the application, prerecorded audio files or dynamically generated text to speech audio may explain the options available to the user **180**. The user **180** may be given the choice to select options using DTMF (dual-tone multi-frequency) tones or spoken words. Examples of typical IVR applications include telephone banking and credit card transactions.

In an implementation, the phone system **125** may comprise a voice portal which gives access to information maintained by the institution system **105** through spoken commands and voice responses. The voice portal could be an access point for any type of information, services, or transactions found on the Internet. A voice portal may be automated and/or Internet-based to provide interactive voice services. Information may also be provided to the user **180** via the representative **140**.

The institution system **105** may comprise a contact routing engine **139**. The contact routing engine **139** may be used to determine whether the representative **140** is available to call back the user **180** at the phone **184** of the user **180** and may also be used to determine which representative is available, as described further herein.

In an implementation, the user **180** may use the user interface module **120** to interact with the authentication engine **130**, for example, to authenticate to the institution system **105** via one or more communications channels. The user **180** may use the user interface module **120** to request or receive information from the institution system **105**, e.g., in conjunction with the data source access engine **150** which may retrieve data from data source(s) **155**, storage **108**, and other storage internal and/or external to the institution system **105**, in an implementation.

Data may also be provided to the authentication engine **130** by the user **180** or the representative **140**. The data may be received via the user interface module **120** in an implementation. The retrieved and/or received data may be associated with the user **180** and may be used to authenticate the user **180** and provide access to information maintained by the institution system **105** via one or more communications channels.

The institution system **105** may comprise one or more computing devices **106**. The user **180** may interact with the computing device(s) **106** via the user computing device **182**, the phone **184**, or the mobile device **186** via the appropriate communications channel. The computing device(s) **106** may have one or more processors **107**, storage **108** (e.g., storage devices, memory, etc.), and software modules **109**. The computing device(s) **106**, including its processor(s) **107**, storage **108**, and software modules **109**, may be used in the performance of the techniques and operations described herein. Information associated with the user **180**, the mobile device **186** of the user **180**, and authentication of the user **180** may be stored in storage **108** or other storage such as data source(s) **155**, for example.

Examples of software modules **109** may include modules for identifying and authenticating the user **180**, generating web page content for display via the data channel **160** and/or the mobile channel **166**, generating phone system content, determining the type of mobile device **186** the user is accessing the website **118** with, retrieving an emulator for the mobile device **186** from the emulator library **137** and loading the emulator on the representative computing device **144**, and receiving requests and instructions from the user **180**, described further herein. While specific functionality is described herein as occurring with respect to specific modules, the functionality may likewise be performed by more, fewer, or other modules. An example computing device and its components are described in more detail with respect to FIG. **6**.

It is contemplated that the techniques described herein may be used with respect to two separate user devices each having at least one communications channel, or a single user device having multiple communications channels.

FIG. **2** is an operational flow of an implementation of a method **200** that may be used to provide device emulation on a mobile channel. At **210**, a user, such as the user **180**, may access a website of an institution system, such as the website **118** of the institution system **105**, via a mobile channel, such as the mobile channel **166**, using a mobile device, such as the mobile device **188** (e.g., using a browser on the mobile device), and may be identified and authenticated via the mobile channel using known authentication techniques, such as two-factor authentication or other types of strong authentication using known strong authentication techniques (e.g., involving user name, password, pass phrase, PIN, or any

other authentication factors). The user may wish to browse the website for account information, information on products and services, etc.

At **220**, using known techniques, the institution system may determine the type of mobile device (e.g., an iPhone, a Blackberry, a Samsung smartphone, etc.) that the user is using to access the website over the mobile channel and store this information in a database record associated with the user, for example. Identification information pertaining to the user and the session may also be stored in the database record. Content may be provided from the institution system (e.g., the website of the institution system) to the mobile device via the mobile channel at **230**.

During the interaction with the website, the user may reach a point where they have a question or would like assistance or further information immediately, e.g., before making a purchase of goods or services. At some point, the user may initiate another connection to the institution system via another communications channel with the same device, such as a data channel or voice channel on the mobile device, or a different device such as a phone or personal computer (PC), for example. Thus, a user may access an institution system via more than one communications channel, either by the same device (e.g., a mobile device accessing the institution system via a mobile channel, a voice channel, and/or a data channel) or by different devices (e.g., a PC via a data channel or a phone via a voice channel). Communication may thus be established between the institution system (e.g., a representative) and the user.

At **240**, the user may call the institution system, using the mobile device or any phone, to speak with a representative, e.g., about content or information from the institution system that is displayed on the mobile device, about an interaction of the user with the website as displayed on the mobile device, about the user interface that is displayed on the mobile device, etc. The user may use the same device, such the mobile device of the user, to concurrently access an institution system through multiple communications channels (mobile channel, voice channel, data channel, etc.) on the same device. In an implementation, the user may contact and interact with the representative of the institution by other electronic techniques, such as instant message, text message, or web chat, for example.

It may be determined if the user is still in an active session on the first communications channel (e.g., if the user is already authenticated to the system on the first communications channel such as the mobile channel). In an implementation, the authentication engine may query the various communications channels to confirm that an authenticated session with the user is already in progress.

At **250**, the user may be identified and authenticated over the voice channel (or data channel if the user is contacting, the institution system via a data channel) using known authentication techniques. The identification of the user over the voice channel (or the data channel) may be used to identify the session of the user over the mobile channel, e.g., by accessing the database record associated with the user that had previously been stored at **220**. The identification of the user over the voice channel may be used as a pointer into the appropriate database record associated with the user and data from the database may be retrieved pertaining to the user and the session over the mobile channel. Thus, the institution system may identify the user's session over the mobile channel pursuant to receiving an identification of the user over the voice channel.

At **260**, it may be determined if the mobile device is supported by an emulator. Such a determination may be performed by determining if the institution system has an emulator that corresponds to the mobile device type from **220**. If so, at **270**, an emulator associated with the determined mobile device may be retrieved from storage of the institution system (e.g., the emulator library **137** comprising a plurality of emulators, each of the plurality of emulators associated with a different type of mobile device), and at **280**, the emulator may be provided to the computing device of the representative. The representative's view of the website may be changed to that of the mobile device's rendering of the website through the emulator. In this manner, the representative may view the same user interface that the user is provided on the mobile device.

If it is determined at **260** that the mobile device is not supported by an emulator, a default emulator may be used to provide a default mobile view of the website to the representative via the representative computing device at **290**. The default mobile view of the website may be a view for a general mobile device and not tailored to a specific mobile device.

FIG. **3** is an operational flow of another implementation of a method **300** that may be used to provide device emulation on a mobile channel. At **310**, similar to **210**, a user may access a website of an institution system via a mobile channel using a mobile device, and may be identified and authenticated using known authentication techniques. Content may be provided from the institution system to the mobile device via the mobile channel at **320**.

At **330**, a call request icon directed to obtaining help for the user may be displayed on the page of the website that is being rendered on the mobile device. An icon, a link, or other selectable item such as a button or menu item (collectively referred to herein as an icon) may be displayed on the page along with other content to request an immediate callback (e.g., within about 10 seconds) from a representative at the institutions system associated with the website or page. The icon may be displayed with a message, for example, that states "click to speak with a representative" or the like.

At some point, if the icon is being displayed, the user may select or click on the icon at **340** to request to speak with a representative. After the user clicks the icon, for example, previously stored phone numbers associated with the user may be displayed in a window, and the user may select one of the numbers to be called back on. Alternately, the user may enter a number in a window on which to receive the callback. The user may also input comments or questions in the window, for example, which may be provided to the representative ahead of the callback.

When the request for a callback is submitted, a representative may be selected (e.g., via the contact routing engine **139** of FIG. **1**) to call the user back with help, in some embodiments immediately, using the number the user selected or entered. In this manner, the user may remain on the website via the mobile channel and receive the assistance via a voice channel.

This request may be sent to a web service at **350** for a callback to the user from an available representative. At **360**, the web service may capture the user session data (e.g., contextual information, such as type of mobile device used to access the website, a user identifier and/or other user information, webpage clicked from, additional session information, etc.) At **370**, the web service may make a call to storage, such as a central user information database associated with the institution system, for a data lookup to retrieve the user's previously stored phone numbers or contact information (e.g., gathered from a user's earlier purchase,

membership or registration information, or public sources such as online telephone listings or books).

At **380**, a representative may be identified that is to call the user and the data from **360** and **370** may be passed to the representative. At **385**, an emulator may be retrieved from storage using the device type (e.g., determined at **360**) that is used by the user on the mobile channel and this emulator is provided on the representative computing device. The representative's view of the website is changed to that of the mobile device's rendering of the website through the emulator. In this manner, the representative may view the same user interface that the user is provided on the mobile device. At **390**, the representative may call the user (either manually or with an auto-dialer, for example) and the representative and the user may engage in a phone conversation, e.g., about the user's mobile channel session with the website that is being provided to the mobile device of the user.

FIG. **4** is an operational flow of another implementation of a method **400** that may be used to provide device emulation on a mobile channel. At **410**, a user may access a website of an institution system via a mobile channel using a mobile device, and may be identified and authenticated using known authentication techniques. Content may be provided from the institution system to the mobile device via the mobile channel at **420**. At **430**, a call request icon directed to obtaining help for the user may be displayed on the page of the website that is being rendered on the mobile device. The user may select or click on the icon at **440** to request to speak with a representative. Operations **410** through **440** are similar to operations **310** through **340** described with respect to the method **300** and their further descriptions may be omitted for brevity.

At **450**, it may be determined if the mobile device has the capability to place a phone call (e.g., via a voice channel). If not, then processing may proceed at **350** as set forth above with respect to the method **300**.

If the mobile device is able to place a phone call, then at **460**, a web service may capture the user session data (e.g., contextual information, such as type of mobile device used to access the website, a user identifier and/or other user information, webpage clicked from, additional session information, etc.) and provide this information to storage of the institution system. At **470**, the mobile device is instructed to place a call to a representative, e.g., via an application on the mobile device and using a phone number or contact information of the representative provided upon selection of the call request icon.

At **480**, the representative may answer the phone and pursuant to the user being identified, the data from **460** may be provided to the representative (e.g., from storage). At **490**, an emulator may be retrieved from storage using the device type that is used by the user on the mobile channel and this emulator may be provided on the representative computing device, thereby changing the representative's view of the website to that of the mobile device's rendering of the website. The representative and user may engage in a phone conversation, e.g., about the user's mobile channel session with the website that is being accessed by the mobile device of the user.

FIG. **5** is an operational flow of another implementation of a method **500** that may be used to provide device emulation on a mobile channel. At **510**, similar to **210**, a user may access a website of an institution system via a mobile channel using a mobile device, and may be identified and authenticated using known authentication techniques. Content may be provided from the institution system to the mobile device via the mobile channel at **520**.

At **530**, using known techniques and similar to **220** for example, the institution system may determine the type of mobile device that the user is using to access the website over the mobile channel. Similar to **260**, it may be determined at **540** if the mobile device is supported by an emulator in storage of the institution system.

If so, at **550**, similar to **330**, a call request icon directed to obtaining help for the user may be displayed on the page of the website that is being rendered on the mobile device and processing may continue at **340** or **440**, for example, depending on the implementation. Thus, it may be determined whether an icon should be displayed, e.g., in a corner of the page display, that is directed to a callback request. In some embodiments, the icon may be displayed only under certain circumstances or rules (e.g., if the mobile device is supported by an emulator).

If the mobile device is not supported by an emulator as determined at **540**, an icon directed to obtaining help for the user may not be displayed on the page of the website that is being rendered on the mobile device. Should the user call in to the institution system to speak with a representative, a default mobile view of the website may be generated and provided to the representative at **590**.

FIG. **6** shows an exemplary computing environment in which example embodiments and aspects may be implemented. The computing system environment is only one example of a suitable computing environment and is not intended to suggest any limitation as to the scope of use or functionality.

Numerous other general purpose or special purpose computing system environments or configurations may be used. Examples of well known computing systems, environments, and/or configurations that may be suitable for use include, but are not limited to, PCs, server computers, handheld or laptop devices, multiprocessor systems, microprocessor-based systems, network PCs, minicomputers, mainframe computers, embedded systems, distributed computing environments that include any of the above systems or devices, and the like.

Computer-executable instructions, such as program modules, being executed by a computer may be used. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Distributed computing environments may be used where tasks are performed by remote processing devices that are linked through a communications network or other data transmission medium. In a distributed computing environment, program modules and other data may be located in both local and remote computer storage media including memory storage devices.

With reference to FIG. **6**, an exemplary system for implementing aspects described herein includes a computing device, such as computing device **600**. In its most basic configuration, computing device **600** typically includes at least one processing unit **602** and system memory **604**. Depending on the exact configuration and type of computing device, system memory **604** may be volatile (such as RAM), non-volatile (such as read-only memory (ROM), flash memory, etc.), or some combination of the two. This most basic configuration is illustrated in FIG. **6** by dashed line **606**.

Computing device **600** may have additional features and/or functionality. For example, computing device **600** may include additional storage (removable and/or non-removable) including, but not limited to, magnetic or optical disks

or tape. Such additional storage is illustrated in FIG. **6** by removable storage **608** and non-removable storage **610**.

Computing device **600** typically includes a variety of computer-readable media. Computer-readable media can be any available media that can be accessed by computing device **600** and include both volatile and non-volatile media, and removable and non-removable media. By way of example, and not limitation, computer-readable media may comprise computer storage media and communication media.

Computer storage media include volatile and non-volatile, and removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. System memory **604**, removable storage **608**, and non-removable storage **610** are all examples of computer storage media. Computer storage media include, but are not limited to, RAM, ROM, Electrically Erasable Programmable Read-Only Memory (EEPROM), flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by computing device **600**. Any such computer storage media may be part of computing device **600**.

Computing device **600** may also contain communication connection(s) **612** that allow the computing device **600** to communicate with other devices. Communication connection(s) **612** is an example of communication media. Communication media typically embody computer-readable instructions, data structures, program modules, or other data in a modulated data signal such as a carrier wave or other transport mechanism, and include any information delivery media. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media include wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), infrared, and other wireless media. The term computer-readable media as used herein includes both storage media and communication media.

Computing device **600** may also have input device(s) **614** such as a keyboard, mouse, pen, voice input device, touch input device, etc. Output device(s) **616** such as a display, speakers, printer, etc. may also be included. All these devices are well known in the art and need not be discussed at length here.

Computing device **600** may be one of a plurality of computing devices inter-connected by a network. As may be appreciated, the network may be any appropriate network, each computing device **600** may be connected thereto by way of communication connection(s) **612** in any appropriate manner, and each computing device **600** may communicate with one or more of the other computing devices **600** in the network in any appropriate manner. For example, the network may be a wired or wireless network within an organization or home or the like, and may include a direct or indirect coupling to an external network such as the Internet or the like.

It should be understood that the various techniques described herein may be implemented in connection with hardware or software or, where appropriate, with a combination of both. Thus, the methods and apparatus of the presently disclosed subject matter, or certain aspects or portions thereof, may take the form of program code (i.e., instructions) embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other machine-readable storage medium wherein, when the program code is loaded into and executed by a machine, such as a computer, the machine becomes an apparatus for practicing the presently disclosed subject matter. In the case of program code execution on programmable computers, the computing device generally includes a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. One or more programs may implement or utilize the processes described in connection with the presently disclosed subject matter, e.g., through the use of an application programming interface (API), reusable controls, or the like. Such programs may be implemented in a high level procedural or object-oriented programming language to communicate with a computer system. However, the program(s) can be implemented in assembly or machine language, if desired. In any case, the language may be a compiled or interpreted language and it may be combined with hardware implementations.

Although exemplary embodiments may refer to utilizing aspects of the presently disclosed subject matter in the context of one or more stand-alone computer systems, the subject matter is not so limited, but rather may be implemented in connection with any computing environment, such as a network or distributed computing environment. Still further, aspects of the presently disclosed subject matter may be implemented in or across a plurality of processing chips or devices, and storage may similarly be effected across a plurality of devices. Such devices might include PCs, network servers, and handheld devices, for example.

Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

What is claimed is:

**1**. A method for device emulation, comprising the steps of:

providing content on a webpage of an institution's website being accessed by a user on a mobile device of the user over a mobile channel;

receiving a phone call from the user while the content is being accessed;

determining a representative of the institution to receive the phone call from the user;

determining the type of mobile device being used;

loading on a computer device of the representative an emulator that corresponds to the type of mobile device being used; and

conducting the phone call between the representative and the user while the content is being accessed.

**2**. A method as set forth in claim **1** wherein the step of loading an emulator comprises the step of retrieving one emulator from a plurality of emulators in storage, each one of the plurality of emulators being associated with a different type of mobile device.

**3**. A method as set forth in claim **1** wherein the phone call is received from the mobile device.

**4**. A method as set forth in claim **1** wherein the phone call is received over a voice channel that is separate from the mobile device.

**5**. A method as set forth in claim **1** further comprising the step of capturing data regarding the user's session with the

website over the mobile channel and providing the data to the computing device of the representative.

**6**. A method as set forth in claim **5** further comprising the step of authenticating the user to the representative.

**7**. A non-transitory computer-readable medium comprising computer-readable instructions for device emulation when a phone call is received from a user, the computer-readable instructions comprising instructions executed to:

provide content on a webpage of an institution's website being accessed by the user on a mobile device of the user over a mobile channel;

determine a representative of the institution to receive the phone call from the user;

determine the type of mobile device being used; and

load on a computing device of the representative an emulator that corresponds to the type of mobile device being used.

**8**. A non-transitory computer-readable medium as set forth in claim **7** wherein the instructions to load an emulator comprise instructions executed to retrieve one emulator from a plurality of emulators in storage, each one of the plurality of emulators being associated with a different type of mobile device.

**9**. A non-transitory computer-readable medium as set forth in claim **7** wherein the instructions provide content over a channel that is the same channel over which the phone call is received.

**10**. A non-transitory computer-readable medium as set forth in claim **7** wherein the instructions provide content over a channel that is different from the channel over which the phone call is received.

**11**. A non-transitory computer-readable medium as set forth in claim **7** further comprising instructions to capture data regarding the session with the website over the mobile channel and to provide the data to the computing device of the representative.

**12**. A non-transitory computer-readable medium as set forth in claim **7** further comprising instructions to authenticate the user to the representative.

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